IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

MICROBES, INC. ET AL.	§	
	§	
v.	§	CASE NO. 2:09-CV-237-CE
	§	
THE ESPOMA COMPANY, ET AL.	§	

MEMORANDUM OPINION AND ORDER

I. INTRODUCTION

The court held a *Markman* hearing on March 23, 2011. After considering the submissions and the arguments of counsel, the court issues the following order concerning the claim construction issues.

II. OVERVIEW OF THE PATENTS AND TECHNOLOGY

Plaintiffs Microbes, Inc. and Rhizogen L.L.C. ("Plaintiffs") filed this suit against defendants The Espoma Company, Advanced Microbial Solutions L.L.C. ("AMS"), and Calloway's Nursery, Inc. (collectively "Defendants"), alleging infringement of U.S. Patent Nos. 6,878,179 (the "'179 Patent"), 7,044,994 (the "'994 Patent"), and 7,442,224 (the "'224 Patent"). The '994 and '224 Patents are continuations of the '179 Patent and all of the patents-in-suit have the same specification.[1] The patents are all entitled "Fertilizer Compositions and Methods of Making and Using Same" and relate to fertilizer compositions and methods of using fertilizer compositions to increase yield and increase the concentration of certain microorganisms in the soil next to a plant. The asserted claims in the '179 Patent are Claims 20 and 21. In the '994 Patent, Claims 1-4, 7, 9, 14, 23, 24, and 27 are asserted, and in the '224 Patent, Claims 12 and 14

[1] For convenience, all citations to the specification of the patents-in-suit will be to the '179 Patent.

are asserted. Independent Claim 20 of the '179 Patent is set out below and is representative of the asserted claims:

> A solid fertilizer composition for plant production comprised of decontaminated manure, Bacillus spores, humic acid and, optionally, one or more N--P--K compounds, wherein the Bacillus spores are from strains of probiotic Bacillus bacteria that enhance beneficial microbial populations within a rhizosphere of a plant.

All the asserted claims share a core feature – they all recite a fertilizer composition that includes both "decontaminated manure" and "Bacillus spores."

III. GENERAL PRINCIPLES GOVERNING CLAIM CONSTRUCTION

"A claim in a patent provides the metes and bounds of the right which the patent confers on the patentee to exclude others from making, using or selling the protected invention." *Burke, Inc. v. Bruno Indep. Living Aids, Inc.*, 183 F.3d 1334, 1340 (Fed. Cir. 1999). Claim construction is an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

To ascertain the meaning of claims, the court looks to three primary sources: the claims, the specification, and the prosecution history. *Markman*, 52 F.3d at 979. The specification must contain a written description of the invention that enables one of ordinary skill in the art to make and use the invention. *Id.* A patent's claims must be read in view of the specification, of which they are a part. *Id*. For claim construction purposes, the description may act as a sort of dictionary, which explains the invention and may define terms used in the claims. *Id*. "One purpose for examining the specification is to determine if the patentee has limited the scope of the claims." *Watts v. XL Sys., Inc.*, 232 F.3d 877, 882 (Fed. Cir. 2000).

Nonetheless, it is the function of the claims, not the specification, to set forth the limits of the patentee's invention. Otherwise, there would be no need for claims. *SRI Int'l v. Matsushita*

Elec. Corp., 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The patentee is free to be his own lexicographer, but any special definition given to a word must be clearly set forth in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992). Although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments. *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994).

This court's claim construction decision must be informed by the Federal Circuit's decision in *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In *Phillips*, the court set forth several guideposts that courts should follow when construing claims. In particular, the court reiterated that "the *claims* of a patent define the invention to which the patentee is entitled the right to exclude." 415 F.3d at 1312 (emphasis added) (*quoting Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To that end, the words used in a claim are generally given their ordinary and customary meaning. *Id*. The ordinary and customary meaning of a claim term "is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id*. at 1313. This principle of patent law flows naturally from the recognition that inventors are usually persons who are skilled in the field of the invention and that patents are addressed to and intended to be read by others skilled in the particular art. *Id*.

The primacy of claim terms notwithstanding, *Phillips* made clear that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the

specification." *Id*. Although the claims themselves may provide guidance as to the meaning of particular terms, those terms are part of "a fully integrated written instrument." *Id*. at 1315 (quoting *Markman*, 52 F.3d at 978). Thus, the *Phillips* court emphasized the specification as being the primary basis for construing the claims. *Id*. at 1314-17. As the Supreme Court stated long ago, "in case of doubt or ambiguity it is proper in all cases to refer back to the descriptive portions of the specification to aid in solving the doubt or in ascertaining the true intent and meaning of the language employed in the claims." *Bates v. Coe*, 98 U.S. 31, 38 (1878). In addressing the role of the specification, the *Phillips* court quoted with approval its earlier observations from *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998):

> Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

Phillips, 415 F.3d at 1316. Consequently, *Phillips* emphasized the important role the specification plays in the claim construction process.

The prosecution history also continues to play an important role in claim interpretation. Like the specification, the prosecution history helps to demonstrate how the inventor and the PTO understood the patent. *Id.* at 1317. Because the file history, however, "represents an ongoing negotiation between the PTO and the applicant," it may lack the clarity of the specification and thus be less useful in claim construction proceedings. *Id*. Nevertheless, the prosecution history is intrinsic evidence that is relevant to the determination of how the inventor understood the invention and whether the inventor limited the invention during prosecution by narrowing the scope of the claims. *Id.*

Phillips rejected any claim construction approach that sacrificed the intrinsic record in favor of extrinsic evidence, such as dictionary definitions or expert testimony. The *en banc* court condemned the suggestion made by *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), that a court should discern the ordinary meaning of the claim terms (through dictionaries or otherwise) before resorting to the specification for certain limited purposes. *Phillips*, 415 F.3d at 1319-24. The approach suggested by *Texas Digital*—the assignment of a limited role to the specification—was rejected as inconsistent with decisions holding the specification to be the best guide to the meaning of a disputed term. *Id*. at 1320-21. According to *Phillips*, reliance on dictionary definitions at the expense of the specification had the effect of "focus[ing] the inquiry on the abstract meaning of words rather than on the meaning of claim terms within the context of the patent." *Id*. at 1321. *Phillips* emphasized that the patent system is based on the proposition that the claims cover only the invented subject matter. *Id.* What is described in the claims flows from the statutory requirement imposed on the patentee to describe and particularly claim what he or she has invented. *Id*. The definitions found in dictionaries, however, often flow from the editors' objective of assembling all of the possible definitions for a word. *Id*. at 1321-22.

Phillips does not preclude all uses of dictionaries in claim construction proceedings. Instead, the court assigned dictionaries a role subordinate to the intrinsic record. In doing so, the court emphasized that claim construction issues are not resolved by any magic formula. The court did not impose any particular sequence of steps for a court to follow when it considers disputed claim language. *Id*. at 1323-25. Rather, *Phillips* held that a court must attach the appropriate weight to the intrinsic sources offered in support of a proposed claim construction, bearing in mind the general rule that the claims measure the scope of the patent grant.

IV. TERMS IN DISPUTE

a. The Manure Terms

i. "Decontaminated Manure" ('179: 20; '994: 1, 4, 23; '224: 12, 14)

Representative Claim Language	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
179 Patent, Claim 20 A solid fertilizer composition for plant production comprised of **decontaminated manure**, Bacillus spores, humic acid and, optionally, one or more N-P-K compounds, wherein the Bacillus spores are from strains of probiotic Bacillus bacteria that enhance beneficial microbial populations within a rhizosphere of a plant.	Manure that has been treated to reduce the viable plate count of aerobic and facultative bacteria in the manure to below ten million cfu/gram but is not sterilized. Manure is sterilized if it contains no living microorganisms that can be detected in terms of "total aerobic/facultative viable plate count."	Manure that has been treated to reduce the density of live microbes by a factor of at least 2 logs (100 times), but has not been completely sterilized. **Further claim construction is required if the manure is derived from broiler chicken litter:** If the manure is derived from broiler chickens, the manure must be treated to be free from straw or other forms of litter or bedding.

1. Plaintiffs' Construction Arguments

Plaintiffs propose that the court should construe "decontaminated manure" to mean "manure that has been treated to reduce the viable plate count of aerobic and facultative bacteria in the manure to below ten million cfu/gram but is not sterilized. Manure is sterilized if it contains no living microorganisms that can be detected in terms of total aerobic/facultative viable plate count." According to Plaintiffs, this definition reflects the following definitional statement in the specification:

> For lack of definitive terminology this inventor will use the term "decontaminated manure" for manure that has a reduced viable plate count according to the specifications stated above.

'179 Patent at 9:63-67. Directly above this definitional statement is the following text, which Plaintiffs argue completes the definition of "decontaminated manure:"

> The present invention requires substantially dry manure, moisture content preferably less than 20 weight percent, preferably less than 15 weight percent, chicken or swine origin, that has a microbial plate count below ten million…cfu/gram (aerobic/facultative: total plate count on tryptic soy agar, 3 days, 32.degree. C.), preferably below one million…cfu/gram. This represents a 100 to 1,000 fold reduction, two-three logs, compared to the total count in fresh

> manure. When manure with a microbial content below one million cfu/gram is used according to the teachings of the present invention, the resulting fertilizer formulations preferably have a Bacillus purity of 90 percent or greater.

Id. at 9:51-63. Plaintiffs argue that all forty plus instances of "decontaminated manure" in the specification are consistent with their proposed definition.

2. Defendants' Construction Arguments

Defendants argue that the patentee acted as his own lexicographer in defining the term "decontaminated manure," and thereby engrafted three specific limitations on the ordinary meaning of "decontaminated manure": (1) the manure must come from chicken or swine; (2) if the manure comes from broiler chickens, it must be rendered free of litter or bedding; and (3) the manure must have a total microbial plate count per gram reduced by 2-4 logs (100 to 10,000) compared with fresh, untreated (raw) manure.

With regard to the first and second limitation, Defendants argue that the following specification language evinces a clear intention to limit the type of "decontaminated manure" suitable for use in the invention:

> One of the critical discoveries of the present invention involves the unique application of animal manure in potentiating the effect of the Bacillus microorganisms; specifically, chicken or swine manure, produced without litter or bedding, and produced from animals not receiving growth-promoting antibiotics in their feed.

Id. at 9:28-33. According to Defendants, this sentence indicates that not all animal manures can potentiate the effect of Bacillus well enough that it can be used in the invention. Chicken or swine manure, produced without litter or bedding, is identified as being suitable for use in the invention (provided they were not fed growth-promoting antibiotics), but other manures are either not useable or need some type of remediation to make them useful.

Defendants further argue that the specification makes it clear that if broiler chicken manure is used, the manure must be cleared of all litter or bedding mixed into the manure. Defendants rely on the following specification language:

> Manure from ruminant animals such as cattle and sheep, or from broiler chickens, is not generally useful for the purpose of the present invention because it usually contains a high percentage of non-nutritive substances such as sawdust, rice hulls, straw or other forms of litter and bedding. The art and science of the present invention does not rule out the use of these manure types if they can be obtained free of undesirable substances and rendered below 1x10ˆ7 cfu/gram with respect to total, viable, aerobic/facultative microorganisms.

Id. at 16:61-17:3. Defendants argue that this statement constitutes a clear disclaimer of all broiler chicken manure that has not been cleared of "undesirable substances" and rendered below ten million cfu/gram total viable plate count. According to Defendants, there is no ambiguity regarding what "undesirable substances" must be removed from the broiler chicken manure – i.e., it is the litter and bedding mix referenced in the sentence just prior to the disclaiming sentence.

With regard to the third limitation, Defendants argue that the patentee did more than just identify which manures were compatible with the invention, he also required that the "decontaminated manure" be treated to significantly reduce the living microorganisms in it. The Defendants rely on the following discussion of the properties of chicken manure:

> Chicken manure, for example, contains the following amounts of N, P (P.sub.2 O.sub.5), and K (K.sub.2 O) in lbs. per 1,000 U.S. gallons: N=80, P.sub.2 O.sub.5 =36, K.sub.2 O=96. In addition, there are many organic compounds that may serve as microbial nutrients. Fresh layer chicken manure, 13% dry matter content, contains over one billion…cfu/gram of aerobic/facultative microorganisms, drying at 65.degree. C. reduces this count, slightly, by approximately one-half. Such manure, nutrient content not-with-standing, cannot be used in the present invention. Manure with high concentrations of microorganisms will grossly contaminate the fertilizer formulations of this invention and result in poor growth of probiotic, Bacillus microorganisms in the rhizosphere….

> The present invention requires substantially dry manure, moisture content preferably less than 20 weight percent, preferably less than 15 weight percent, chicken or swine origin, that has a microbial plate count below ten million…cfu/gram (aerobic/facultative: total plate count on tryptic soy agar, 3 days, 32.degree. C.), preferably below one million…cfu/gram. This represents a 100 to 1,000 fold reduction, two-three logs, compared to the total count in fresh manure. When manure with a microbial content below one million cfu/gram is used according to the teachings of the present invention, the resulting fertilizer formulations preferably have a Bacillus purity of 90 percent or greater. For lack of definitive terminology this inventor will use the term "decontaminated manure" for manure that has a reduced viable plate count according to the specifications stated above.

Id. at 9:33-67. In this section, the patentee explains that manure with high concentrations of microorganisms cannot be used in the invention. Rather, the invention requires that the "decontaminated manure" have reduced levels of microbial content – i.e., a microbial plate count that is below ten million cfu/gram, preferably below one million cfu/gram. However, the Defendants argue that the above definition of "decontaminated manure" fails to exclude sterilized manure, which would meet the preferred microbial plate count of less than one million cfu/gram. It is undisputed that the patents-in-suit make a distinction between sterilized manure and "decontaminated manure." *See, e.g.*, *id.* at 12:64-65 ("This data provides evidence that Bacilli grow well in chicken manure if it is sterilized *or* decontaminated but do not grow well in raw manure due to its high concentration of microbial contaminants.") The Defendants, however, argue that the above definition of "decontaminated manure" fails to capture this distinction and/or fails to clarify whether the patentee's definition of "decontaminated manure" includes sterilized manure. According to the Defendants, clarification on this issue can be found in the prosecution history.

Claim 1 of the '179 Patent's original application recited "[a] fertilizer composition comprised of decontaminated manure and Bacillus spores. *See* Exhibit 6, at AMS 000133,

attached to Defendants' Responsive Claim Construction Brief. In a response dated October 14, 2004, the patentee amended Claim 1 by adding the underlined portion below:

> A fertilizer composition comprised of decontaminated manure and Bacillus spores, <u>wherein the decontaminated manure has a total aerobic/faculative viable plate count reduced by two to four logs (100 to 10,000 times) compared to raw manure</u>.

Id. The patentee further explained that:

> As used in the invention, "decontaminated" means that the animal manure has a total microbial plate count per gram reduced by 2-4 logs (100 to 10,000) compared with fresh, untreated (raw) manure. Furthermore, when manure with a microbial content below 1 x 10^6 cfu/gram is employed, the fertilizer composition of the invention will have Bacillus purity of greater than 90 percent.

Exhibit 6, at AMS 000138, attached to Defendants' Responsive Claim Construction Brief. According to Defendants, considering that the patentee explained that the 2-4 log reduction is part of the definition of "decontaminated manure," and the fact that without this definition decontaminated manure would encompass sterilized manure, it is clear that the 2-4 log reduction must apply even to those claims where "decontaminated manure" is recited without the "wherein" phrase.

In response, with respect to Defendants' argument that "decontaminated manure" must come from chicken or swine and be produced without bedding or litter, Plaintiffs argue that these limitations are merely preferred embodiments and should not be engrafted into the definition of "decontaminated manure." Plaintiffs contend that although the parties agree that the patentee's preferred type of decontaminated manure is "layer chicken manure," the Defendants have failed to identify a clear and unmistakable disavowal of other types of manure, including broiler chicken manure that has a reduced amount of bedding and litter in it. According to Plaintiffs, the following language, relied on by Defendants, does not rise to the level of a clear and unmistakable disclaimer of all forms of broiler chicken manure, even if the manure contains only

some insignificant amount of bedding or litter, and even if it has been processed to physically grind up the straw and litter into a desirable or useful form:

> Manure from ruminant animals such as cattle and sheep, or from broiler chickens, is not generally useful for the purpose of the present invention because it usually contains a high percentage of non-nutritive substances such as sawdust, rice hulls, straw or other forms of litter and bedding. The art and science of the present invention does not rule out the use of these manure types if they can be obtained free of undesirable substances and rendered below 1x10^7 cfu/gram with respect to total, viable, aerobic/facultative microorganisms.

Id. at 16:61-17:3. According to Plaintiffs, since there is no practical way to actually remove every bit of the bedding and litter from broiler chicken manure, the patentee certainly did not intend to make the broad sweeping disclaimer that Defendants contend he made when he said "free of undesirable substances." Plaintiffs also note that the patentee did not define these "undesirable substances" that must be removed from the broiler chicken's manure. Finally, Plaintiffs argue that the express language requires only that the manure "*can be obtained* free of undesirable substances," which does not rule out broiler chicken manure that has been processed or grinded to convert the manure into a desirable form.

With regard to Defendants argument that the manure must have a total microbial plate count per gram reduced by 2-4 logs (100 to 10,000), Plaintiffs contend that this proposed limitation is, again, merely a preferred embodiment that should not be engrafted into the definition of "decontaminated manure." According to Plaintiffs, the specification often indicates that the chief characteristic of the "decontaminated manure" is the final plate count (i.e., below ten million), not the process for achieving it (i.e., reducing the plate count by 2-4 logs). Plaintiffs note that even the language Defendants rely on refers to a final manure level of "preferably below one million" cfu/gram, and explains that this level *represents* a 100 to 1,000 fold reduction – i.e., two-three logs:

> The present invention requires substantially dry manure, moisture content preferably less than 20 weight percent, preferably less than 15 weight percent, chicken or swine origin, that has a microbial plate count below ten million…cfu/gram (aerobic/facultative: total plate count on tryptic soy agar, 3 days, 32.degree. C.), preferably below one million…cfu/gram. This represents a 100 to 1,000 fold reduction, two-three logs, compared to the total count in fresh manure…. For lack of definitive terminology this inventor will use the term "decontaminated manure" for manure that has a reduced viable plate count according to the specifications stated above.

Id. at 9:33-67. This language illustrates that the key to the invention is not the amount or extent of reduction, but the final reduced amount. Indeed, the patentee's definitional statement explains that the term "decontaminated manure" is "manure that *has a reduced* viable plate count according to the specifications stated above." *Id*. at 9:63-67 (emphasis added).

Plaintiffs also contend that Defendants' argument that the 2-log reduction language is necessary to distinguish between "decontaminated manure" and "sterilized manure" is untenable in light of the fact that Defendants have already agreed that sterilized manure is excluded from the definition of "decontaminated manure." Furthermore, Plaintiffs note that Dr. Kloepper, Defendants' expert, also agrees that, based on the manner in which the specification refers to "decontaminated manure" and "sterilized manure" as different product categories, the definition of "decontaminated manure" does not include sterilized manure.

Finally, Plaintiffs argue that the prosecution language cited by Defendants – "'decontaminated' means that the animal manure has a total microbial plate count per gram reduced by 2-4 logs (100 to 10,000) compared with fresh, untreated (raw) manure" – is nothing more than an explanation of the specific amendment the patentee made to Claim 1 of the '179 Patent and should not be read into the broader definition of all other references to "decontaminated manure." Furthermore, Plaintiffs argue that defining the term "decontaminated manure" itself as manure with a plate count that has been reduced by 2-4 logs would render

superfluous the express recitation of that 2-4 plate count reduction in Claims 1 and 23 of the ’994 Patent.

3. Analysis

With regard to Defendants’ proposed limitations, the first proposed limitation, requiring that the manure come from chicken or swine, is not reflected in Defendants’ proposed construction – i.e., “Manure that has been treated to reduce the density of live microbes by a factor of at least 2 logs (100 times), but has not been completely sterilized. If the manure is derived from broiler chickens, the manure must be treated to be free from straw or other forms of litter or bedding.” Furthermore, the purported disclaimer that Defendants rely on is merely an expression of a preferred embodiment of the invention and does not rise to the level of a clear disclaimer of manures other than chicken and swine manure. ’179 Patent at 9:28-33 (“*One of the critical discoveries* of the present invention involves the unique application of *animal manure* in potentiating the effect of the Bacillus microorganisms; *specifically, chicken or swine manure*….”) (emphasis added). As such, the court rejects Defendants’ argument that the definition of “decontaminated manure” must be limited to chicken or swine manure.

Second, Defendants’ argument that the patentee disclaimed broiler chicken manure unless it was rendered entirely free of straw or other forms of litter or bedding is also rejected. Although the specification states that broiler chicken manure is “not generally useful for the purpose of the present invention because it usually contains a high percentage of non-nutritive substances such as sawdust, rice hulls, straw or other forms of litter and bedding,” this language does not rule out the use of broiler chicken manure. *Id*. at 16:61-17:3. Furthermore, during the claim construction hearing, Defendants conceded that if broiler chicken manure contained only a small amount of bedding and litter, it could still fall within the scope of the claims. Defendants’

proposed construction, however, does not permit the use of broiler chicken manure containing only a small amount of bedding and litter. As such, the court rejects Defendants' argument that the construction of "decontaminated manure" must include a limitation requiring that broiler chicken manure can only be used in the patented invention if it is rendered free from straw or other forms of litter or bedding.

Third, although it is a close call, the Defendants' proposed 2 log reduction limitation is also rejected. Plaintiffs correctly point out that the specification's definition of "decontaminated manure" as "manure that *has a reduced viable plate count* according to the specifications stated above" focuses on the final product of the reduction process – not the process itself, or a comparison of the starting product (raw manure) and the final product (decontaminated manure). *Id.* at 9:65-67 (emphasis added). Furthermore, the first time the reduced viable plate count is described, the specification keys in on the final microbial plate count of the "decontaminated manure" and states that the count should be below ten million cfu/gram – preferably below one million cfu/gram. *Id.* It is only after the final microbial plate count is described that the specification explains that this final count represents a "100 to 1,000 fold reduction, two-three logs, compared to the total count in fresh manure…" *Id.* at 9:51-67. In all, the court concluded that the patent identifies the key characteristic of the "decontaminated manure" to be the final reduced microbial count – i.e., a viable plate count of less than ten million cfu/gram.

It must be noted that the prosecution statement cited by Defendants does provide support for their contention that the definition of "decontaminated manure" should include the 2-log reduction language:

> As used in the invention, "decontaminated" means that the animal manure has a total microbial plate count per gram reduced by 2-4 logs (100 to 10,000) compared with fresh, untreated (raw) manure. Furthermore, when manure with a

> microbial content below 1 x 10^6 cfu/gram is employed, the fertilizer composition of the invention will have Bacillus purity of greater than 90 percent.

However, considering that the specification of the patents-in-suit focuses on the final microbial plate count of the manure and that Defendants' proposed 2-log reduction limitation would render Claims 1 and 23 of the '994 Patent superfluous, the court rejects Defendants' proposed limitation. As such, the court adopts Plaintiffs' proposed construction – i.e., "manure that has been treated to reduce the viable plate count of aerobic and facultative bacteria[2] in the manure to below ten million cfu/gram but is not sterilized."[3]

Finally, Defendants do not criticize Plaintiffs' proposed definition of sterilized manure, which is reflected in the second sentence of Plaintiffs' proposed construction – i.e., "manure is sterilized if it contains no living microorganisms that can be detected in terms of "'total aerobic/facultative viable plate count.'" Furthermore, Defendants' fertilizer expert agreed that, according to the '179 Patent, manure is only sterilized if a plate count test establishes there are no detectible bacteria in the manure. As such, the court adopts Plaintiffs' proposed definition of sterilized manure.

In conclusion, the court adopts Plaintiffs' proposed construction in its entirety – i.e., "decontaminated manure" means "manure that has been treated to reduce the viable plate count of aerobic and facultative bacteria in the manure to below ten million cfu/gram but is not

[2] Defendants' proposed construction references a reduction in the "density of live microbes." Defendants, however, do not offer any support for the contention that "decontaminated manure" should be construed to require such a reduction. Notwithstanding this, the court notes that the specification continuously refers to reductions in the amount of aerobic and facultative bacteria, and, therefore, the court concludes that the correct construction of "decontaminated manure" must reference reduction in those bacteria specifically. *See, e.g.*, '179 Patent at 9:51-63.

[3] The Defendants' proposed construction states that the "decontaminated manure" has not been "completely sterilized." Defendants, however, again fail to provide any support for this proposed construction. The Plaintiffs argue that manure is either sterilized or it is not – there is no such thing as "completely sterilized" manure. Considering this, the court rejects Defendants' proposed "completely sterilized" language.

sterilized. Manure is sterilized if it contains no living microorganisms that can be detected in terms of "total aerobic/facultative viable plate count."

ii. "Raw Manure" ('994: 1, 23)

Representative Claim Language	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
'994 Patent, Claim 1 A fertilizer composition comprised of decontaminated manure and Bacillus spores wherein the decontaminated manure has a total aerobic/facultative viable plate count reduced by 2-4 logs (100 to 10,000 times) compared to **raw manure.** '994 Patent, Claim 23 A solid fertilizer composition for plant production comprised of decontaminated manure, Bacillus spores, humic acid and, optionally, one or more N--P--K compounds wherein the decontaminated manure has a total aerobic/facultative viable plate count reduced by 2 4 logs (100 to 10,000 times) compared to **raw manure.**	The manure that is treated to make the "decontaminated manure" in the fertilizer composition, before such manure undergoes treatment to reduce its "total aerobic/facultative viable plate count."	Raw manure is fresh manure that has not been decontaminated. Raw manure can have between 1-10 billion live microbes per gram.

1. The Parties' Proposed Constructions

Plaintiffs argue that their definition of "raw manure" is consistent with the ordinary meaning of raw manure, the specification, and the related claim language. The specification repeatedly describes "raw" manure as manure that is subjected to a variety of treatment processes that reduce the level of aerobic and facultative bacteria. *See, e.g.*, '179 Patent at 4:45-5:4. Raw manure is also sometimes referred to as "untreated" manure. *See, e.g., id.* at 14:1; 22:23-25. As such, Plaintiffs argue that the only reason for reciting "raw manure" in the claims is to provide a reference point for the level/degree/extent of decontamination necessary to create the "decontaminated manure" of the invention.

Defendants first propose that "raw manure" should be equated to "fresh manure," but do not provide any support for this contention. Plaintiffs, however, argue that although "fresh"

manure is always "raw" manure, the opposite is not true. Fresh manure is manure immediately after it has been excreted from the animal. Certainly, at that point in time, the fresh manure is raw, given that it is untreated. But after a period of time that manure is no longer "fresh" – a contention that Defendants' own expert agreed with. Although it is no longer fresh, if that manure has never been subjected to any level of decontamination (i.e., treatment that causes a reduction in plate count), it is still considered "raw manure."

Defendants also argue that unless a starting microbial count is provided for the "raw manure," claims including the "raw manure" term will be indefinite because there will be no reference point with which to compare the decontaminated manure and the raw manure. For example, Claim 1 of the '994 Patent recites:

> A fertilizer composition comprised of decontaminated manure and Bacillus spores wherein the decontaminated manure has a total aerobic/facultative viable plate count reduced by 2-4 logs (100 to 10,000 times) compared to raw manure**.**

According to the Defendants, the appropriate reference count should be between one and ten billion because the specification explicitly provides a starting range of viable microorganisms in fresh manure of this amount:

> One significant limitation of manure is the gross microbial contamination present in fresh manure; typically, the total number of viable microorganisms ranges between 1-10 billion per gram. The microbial species composition of fresh manure varies significantly and it is not uncommon to find deleterious putrefying bacteria as well as plant and animal pathogens.

Id. at 1:45-58; *see also* 9:37-39 ("Fresh layer chicken manure…contains over one billion …cfu/gram of aerobic/facultative microorganisms….").

2. Analysis

The "raw manure" claims recite:

> A fertilizer composition comprised of decontaminated manure and Bacillus spores wherein the decontaminated manure has a total aerobic/facultative viable plate count reduced by 2-4 logs (100 to 10,000 times) compared to raw manure.

'994 Patent at Claim 1. The parties have agreed that "wherein the decontaminated manure has a total aerobic/facultative viable plate count reduced by 2-4 logs (100 to 10,000 times) compared to raw manure" means "the 'decontaminated manure' in the fertilizer composition has a 'total aerobic/facultative viable plate count' that is 2-4 logs less than the 'total aerobic/facultative viable plate count' of the 'raw manure' used to form the 'decontaminated manure.'" As such, Defendants' contention that there must be a starting reference plate count against which the resulting plate count of the "decontaminated manure" can be measured is incorrect. Under the parties' agreed construction, the starting plate count of "raw manure" is the starting plate count of the specific "raw manure" that is used to create the "decontaminated manure." Therefore, the court rejects Defendants' contention that the construction of "raw manure" must contain a limitation requiring a plate count between 1-10 billion live microbes per gram.

Furthermore, Defendants provide no support for their contention that "raw manure" should be equated with fresh manure. Considering that the specification draws a distinction between fresh manure and "raw manure" and that Defendants' own expert admits that manure is no longer "fresh" after a period of time, the court rejects Defendants' contention that "raw manure" is fresh manure.

In conclusion, the court adopts Plaintiffs' proposed construction of "raw manure" as meaning "the manure that is treated to make the 'decontaminated manure' in the fertilizer

composition, before such manure undergoes treatment to reduce its 'total aerobic/facultative viable plate count.'"

iii. "Total Aerobic/Facultative Viable Plate Count" ('994: 1, 23)

Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**
'994 Patent, Claim 1 A fertilizer composition comprised of decontaminated manure and Bacillus spores wherein the decontaminated manure has a **total aerobic/facultative viable plate count** reduced by 2-4 logs (100 to 10,000 times) compared to raw manure. '994 Patent, Claim 23 A solid fertilizer composition for plant production comprised of decontaminated manure, Bacillus spores, humic acid and, optionally, one or more N--P--K compounds wherein the decontaminated manure has a **total aerobic/facultative viable plate count** reduced by 2 4 logs (100 to 10,000 times) compared to raw manure.	A measurement, expressed in cfu/gram, resulting from counting the total number of colony forming units of both aerobic bacteria and facultative bacteria that have grown on a medium of tryptic soy agar after about 3 days (72 hours) of incubation at 32º C.	The parties have agreed that "wherein the decontaminated manure has a total aerobic/facultative viable plate count reduced by 2-4 logs (100 to 10,000 times) compared to raw manure" means "the "decontaminated manure" in the fertilizer composition has a 'total aerobic/facultative viable plate count' that is 2-4 logs less than the 'total aerobic/facultative viable plate count' of the 'raw manure' used to form the "decontaminated manure." The term "total aerobic/facultative viable plate count" is part of the construction the parties have agreed to above and should be construed consistently therewith. Defendants agree with the definition of "plate count" as being a measurement of colony forming units per gram of fertilizer, but the specific procedure for measurement should not be part of the claim construction. Other growth medium and incubation times and temperatures can produce the same results in plate count, and other evidence can be used to prove the degree of reduction.

1. The Parties' Claim Construction Arguments

Plaintiffs urge the court to construe "total aerobic/facultative viable plate count" to mean "a measurement, expressed in colony forming units, resulting from counting the total number of colony forming units of both aerobic bacteria and facultative bacteria that have grown on a

medium of tryptic soy agar after about 3 days (72 hours) of incubation at 32° C." According to Plaintiffs, their definition is based on the specification, which specifically describes the protocol for measuring "total aerobic/facultative viable plate count" as a measurement that results from counting the total number of colony forming units of both aerobic bacteria and facultative bacteria that have grown on a medium of tryptic soy agar after about 3 days (72 hours) of incubation at 32° C. *See, e.g.* '179 Patent at 9:51-58 ("The present invention requires substantially dry manure,…chicken or swine origin, that has a microbial plate count below ten million or 1x10ˆ7 cfu/gram (*aerobic/facultative: total plate count on tryptic soy agar, 3 days, 32.degree. C.*)….") (emphasis added).

Defendants agree with Plaintiffs' definition of "plate count" as being a measurement of colony forming units per gram of fertilizer, but maintain that the specific procedure for measurement should not be part of the claim construction. Defendants argue that one of ordinary skill in the art at the time the invention was made would have understood that many different methods to calculate plate counts existed without the need to resort to a specific test. The example in the specification is but one test of many. Therefore, a construction requiring a specific test is inappropriate.

2. Analysis

Plaintiffs' reliance on *Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1378 (Fed. Cir. 2005), to support their argument that the specific test described in the specification must be included in the construction of "total aerobic/facultative viable plate count" is misplaced. In *Chimie*, the court incorporated one of the specific tests referenced in the specification because it reconciled ambiguous claim language with the inventor's disclosure. *Id.* In this case, however, there is no such ambiguity in the claim language – the claim language unambiguously states that the

decontaminated manure must be tested in some manner to ensure that its "total aerobic/facultative viable plate count" has been reduced by 2-4 logs (100 to 10,000 times) as compared to raw manure. Although the specification does lay out a specific manner in which this test can be performed, there is no language in the specification disavowing other methods of testing. Furthermore, Plaintiffs have not disputed Defendants' contention that one of ordinary skill in the art would know that many different methods can be used to calculate plate counts. As such, the court adopts the following construction of "total aerobic/facultative viable plate count:" "a measurement, expressed in cfu/gram, of the total number of colony forming units of both aerobic bacteria and facultative bacteria." This definition conforms to the parties' agreed construction without requiring the specific test referenced in the specification.

b. The Bacillus Spores Terms

i. "Bacillus Spores" ('179: 20; '994: 1, 4, 7, 14, 23, 27; '224: 12, 14)

Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**
'994 Patent, Claim 14 The fertilizer composition of claim 1 wherein the **Bacillus spores** are present in sufficient concentration to effect a viable spore count of between 10^6 cfu to 10^9 cfu per gram of dry composition.	The Bacillus bacteria present in the fertilizer composition are predominantly in spore form and not predominantly in vegetative form. (As revised).	The bacteria of the Bacillus genus which are in "spore" form, which is a common shortened form of the term "endospore."

1. The Parties' Proposed Constructions

Plaintiffs' proposed construction of "Bacillus spores" requires that the Bacillus bacteria in the fertilizer composition be predominantly in spore form and not vegetative form. Plaintiffs' argue that their definition is based on the context of the term in the claim, how the term is used in the specification, and the inherent nature and properties of bacillus bacteria. Plaintiffs first note that Bacillus bacteria always includes a mixture of three types of cells: (1) spores, (2) vegetative

cells, and (3) dead cells.[4] According to Plaintiffs, in the context of the claims, the proper construction of the term "Bacillus spores" must require that the Bacillus bacteria in the fertilizer composition are predominantly in spore form, not vegetative form. Plaintiffs next argue that the specification supports their proposed construction. According to Plaintiffs, each time the Bacillus spores are mentioned in the patent specification, more than two *spore* cells are inherently present. Plaintiffs argue that this fact necessarily implies that whenever Bacillus bacteria are referred to as "*spores*" in the claims or specification, it does not mean that the bacteria includes two or more spores generally, but rather that the entire bacteria is predominantly in spore form – not vegetative.

In response, Defendants argue that Plaintiffs' proposed "predominately in spore form" limitation would read a preferred embodiment out of the claims. Defendants explain that a dry fertilizer composition is merely one embodiment of the invention. The fertilizer can also be in the form of slurries, liquids, and solids:

> A major aspect of the present invention involves the production of fertilizer products in forms selected from the group consisting of slurries, liquids, and solid forms.

'179 Patent at 7:19-21. In fact, experiment number 4 is described as having been performed with chicken manure fertilizer in slurry form. *Id.* at 13:16-34. According to Defendants, in a slurry or liquid fertilizer composition, large colonies of vegetative Bacillus can be present and growing in the decontaminated manure fertilizer before additional Bacillus spores are mixed into it. In that situation, the Bacillus spores may not outnumber the colonies of vegetative Bacillus. Plaintiffs do not rebut this contention.

[4] The spore structure of a Bacillus bacterium is important when it experiences a harsh environment and is being dried out. In that case it can survive through periods of environmental stress as a "spore." Then, when the environment returns to favorable conditions, the spore can germinate back into a live reproductive state – i.e., a vegetative state.

2. Analysis

Plaintiffs fail to cite to any references in the specification that distinguish between the number of vegetative cells and the number of spores present in the fertilizer composition. The sole mention of vegetative Bacillus cells in the patents-in-suit does not refer to the number of vegetative cells compared to the number of spore cells, much less say that there are predominately more spore cells in the fertilizer composition. *See* '179 Patent at 15:5-10 ("The dry samples containing Bacillus spores are mixed in sterile distilled water, 1 part dry sample+9 parts water. This mixture is heated at 80 C for 10 minutes and cooled rapidly, this procedure kills microbial vegetative cells but not Bacillus spores."). Furthermore, Plaintiffs fail to rebut Defendants' contention that the "predominately in spore form" limitation would read a preferred embodiment out of the claims. As such, the court rejects Plaintiffs' proposed construction.

Plaintiffs do not contend that Defendants' definition of "Bacillus spores" is erroneous. The court, therefore, adopts Defendants' proposed construction of "Bacillus spores" as meaning "the bacteria of the Bacillus genus that are in 'spore' form, which is a common shortened form of the term 'endospore.'"

ii. "Present in Sufficient Concentration…" ('994: 14)

Representative Claim Language	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
'994 Patent, Claim 14 The fertilizer composition of claim 1 wherein the Bacillus spores are **present in sufficient concentration to effect a viable spore count of between 10^6 cfu to 10^9 cfu per gram of dry composition.**	The "Bacillus spores" in a dry fertilizer composition are present in an amount such that a measurement according to the spore count procedure in the patent results in a viable spore count between 10ˆ6 and 10ˆ9 colony forming units (cfu) per gram of the dry fertilizer composition. The spore count procedure in the patent includes adding distilled water to a sample of the dry fertilizer composition, heating the sample for 10 minutes at 80° C to kill non-spore forming bacteria and then incubating the sample. The term "dry fertilizer composition" means a fertilizer composition formed of solid fertilizer which may also include water moisture of no more than about 20 wt% water.	The fertilizer must include enough spores that are capable of germinating back into Bacillus bacteria to create between 10^6 to 10^9 colony forming units per gram of fertilizer. A colony forming unit is a live reproducing bacteria. This limitation applies to the concentration of the Bacillus spores when the fertilizer is a dry composition.

The parties agree that this limitation applies only to a dry fertilizer composition, and they also agree on the definition of dry composition as being a "fertilizer composition with moisture content less than 20 weight percent." Furthermore, the parties do not fault each other's core constructions – i.e., the parts of the proposed constructions that define the "sufficient concentration." The parties' dispute arises from the Plaintiffs' proposed limitation describing the specific "spore count procedure." Both parties make the same arguments regarding this limitation that they made with regard to the "total aerobic/facultative viable plate count" limitation discussed above.

1. Analysis

First, Plaintiffs again fail to rebut Defendants' contention that there are numerous test procedures which might be used to determine the viable spore count in dry fertilizer

compositions. Furthermore, there is no language in the patents that excludes other testing procedures. As such, the court again rejects Plaintiffs' argument that the specific testing procedure identified in the patents must be read into the claim language.

Second, neither parties' proposed definition of the "sufficient concentration" language is problematic. However, Plaintiffs' proposed "viable spore count" language more closely mirrors the claim language, while the "capable of germinating back" language in Defendants' proposed construction finds no support in the patents. The court, therefore, adopts Plaintiffs' proposed construction of the "sufficient concentration" language.

In conclusion, the court adopts the following construction of "present in sufficient concentration to effect a viable spore count of between 10^6 cfu to 10^9 cfu per gram of dry composition:" "The 'Bacillus spores' in a dry fertilizer composition are present in an amount such that a measurement results in a viable spore count between 10ˆ6 and 10ˆ9 colony forming units (cfu) per gram of the dry fertilizer composition. The term 'dry composition' means a fertilizer composition formed of solid fertilizer which may also include water moisture of no more than about 20 wt% water."

c. "Humic Acid" ('179: 20' '994: 2, 4, 23)

Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**
'994 Patent, Claim 2 The fertilizer composition of claim 1 comprising a **humic acid**.	A mixture of polymers containing aromatic and heterocyclic structures, carboxyl groups, and nitrogen. Humic acid typically contains the brownish-black pigment melanin, and can be obtained from lignite. It is soluble in bases, but insoluble in mineral acids and alcohols. The term "humic acid" also includes humates, which are humic acid salts. The term "humic acid" does not include humus.	Humic acid is an acid that is naturally produced during the decomposition of organic matter. It is commonly used to promote plant growth.

i. The Parties' Proposed Constructions

Plaintiffs argue that their proposed construction is taken directly from the specification:

> As used herein, "humic acid" means a polymeric compound typically containing the brownish-black pigment melanin, and can be obtained from lignite. It is soluble in bases, but insoluble in mineral acids and alcohols. It is not a well-defined compound, but a mixture of polymers containing aromatic and heterocyclic strictures, carboxyl groups, and nitrogen, and is used in drilling fluids, printing inks, and plant growth. See Hawley's Condensed Chemical Dictionary, 12.sup.th Edition, (1993), page 608. As seen in the examples herein, not all humic acids behave in similar fashion.

'179 Patent at 4:5-15. Furthermore, Claim 19 of the '179 Patent recites: "The fertilizer composition of claim 2 wherein the humic acid is potassium humate." And the specification explains that:

> Optionally, if the fertilizer composition produced by the methods of the invention is desired to be in the form of prills or pellets, humic acid is added as a hardening agent, either in the second composition of step (b), or added as a third step (c). Preferably, the humic acid is selected from the group consisting of leonardite and potassium humate.

Id. at 5:5-10; *see also id*. at 15:57-63 ("Specifics of the humic acid tested:…3) Humic acid in the form of potassium humate…."); 15:67-16-1 ("This data demonstrates that humic acids from oxidized lignite and potassium humate promote advantageous hardness values….").

In response, Defendants take issue with the inclusion of "humates" in Plaintiffs' proposed construction. Defendants argue that, since the patentee's definition of "humic acid" requires the compound to be soluble in bases, humate salts must be excluded because salts are not soluble in bases. Furthermore, Defendants' expert testified that one of ordinary skill in the art would know the difference between a salt and an acid and would not equate the two. In reply, Plaintiffs argue that, although humates are technically classified as salts, the patentee acted as his own lexicographer in including at least one humate as a type of "humic acid" for purposes of this invention.

Defendants also argue that the construction of "humic acid" should explain that it is "naturally produced during the decomposition of organic matter" and is "commonly used to promote plant growth." Plaintiffs argue that, although the definition of humic acid in the specification states that humic acid is used in "plant growth," it does not state that it is "commonly used to promote plant growth" as proposed by Defendants. In any event, Plaintiffs contend that the statement is not required for definitional purposes. With regard to Defendants' proposed "naturally produced during decomposition of organic matter" limitation, Plaintiffs point out that the word "decomposition" does not appear even once in the specification. Furthermore, Defendants can cite to nothing in the specification describing humic acid as something that is naturally produced during the decomposition of organic matter.

ii. Analysis

As Plaintiffs note, the claim language itself identifies potassium humate as a "humic acid" within the context of the patents-in-suit. *See* '179 Patent at Claim 19. Furthermore, the specification identifies potassium humate as one of the preferred "humic acids" to be used in the invention: "Preferably, the humic acid is selected from the group consisting of leonardite and potassium humate." *Id.* at 5:5-10. The specification also expressly refers to "humic acid" in the form of potassium humate. *Id.* at 15:62; 15:67-16-1. Considering this, the court concludes that the patentee acted as his own lexicographer in this case – i.e., he defined "humic acid" as including "humates." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) ("…our cases recognize that the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs.").

Defendants fail to provide any support for their argument that the construction of "humic acid" must explain that it is "naturally produced during the decomposition of organic matter" and is "commonly used to promote plant growth." First, as Plaintiffs' note, the "commonly used to promote plant growth" limitation will not assist the jury in interpreting the term "humic acid" and, therefore, is rejected. Second, Defendants propose the "naturally produced during the decomposition of organic matter" limitation because it would encompass "humus." As is evident from Plaintiffs' proposed construction, Plaintiffs argue that the construction of "humic acid" should exclude "humus." Humus is not mentioned in the patents-in-suit and, as Plaintiffs note, the patents never describe humic acid as something that is naturally produced during the decomposition of organic matter. As such, the court agrees with Plaintiffs that the term "humic acid," when read in light of the specification, does not include humus.

In conclusion, the court construes "humic acid" to mean: "a mixture of polymers containing aromatic and heterocyclic structures, carboxyl groups, and nitrogen. Humic acid typically contains the brownish-black pigment melanin, and can be obtained from lignite. It is soluble in bases, but insoluble in mineral acids and alcohols. The term "humic acid" also includes humates, which are humic acid salts. The term "humic acid" does not include humus."

d. "Probiotic Bacillus Bacteria" ('179: 20; '994: 7, 27)

Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**
'994 Patent, Claim 7 The fertilizer composition of claim 1 wherein the Bacillus spores are from strains of **probiotic Bacillus bacteria** capable of enhancing beneficial microbial populations within a rhizosphere of a plant.	No construction is required. In the alternative, this term means Bacillus bacteria that are capable of benefitting a plant when introduced to the soil close to the plant.	Bacillus bacteria that increase yield or reduce nitrogen requirements of agricultural plants.

i. The Parties' Proposed Constructions

The "probiotic Bacillus bacteria" term appears in three of the asserted claims – Claim 20 of the '179 patent and Claims 7 and 27 of the '994 patent. Plaintiffs argue that, in the context of those claims, "probiotic" Bacillus bacteria are those bacteria that are capable of providing some benefit to the plant. Each of the claims recites that the specific benefit of the "probiotic Bacillus bacteria" to the plant is its capability "of enhancing beneficial microbial populations within a rhizosphere of a plant." As such, Plaintiffs contend that the term "probiotic Bacillus bacteria" needs no further construction.

In the alternative, Plaintiffs argue that the court should construe "probiotic Bacillus bacteria" to mean "bacillus bacteria that are capable of benefitting a plant when introduced to the soil close to the plant." Plaintiffs argue that this construction is supported by the specification, which first refers to "probiotic bacillus bacteria" as follows:

> Using [fresh] manure for food plant production can pose health hazards and when added to soil along with beneficial microorganisms such as probiotic Bacillus bacteria, the microorganisms contributed by the manure out grow the beneficial probiotic microorganisms.

'179 Patent at 1:52-57. In this statement, "the beneficial probiotic microorganisms" are a reference to the "probiotic Bacillus bacteria" introduced earlier in the sentence. Furthermore, the specification states that "preferred compositions of the invention are those wherein the Bacillus spores are from strains of probiotic Bacillus bacteria capable of enhancing microbial populations within the rhizosphere." *Id.* at 3:64-66. The specification also explains that:

> A further aspect of the present invention is the discovery that certain probiotic Bacillus species cause an increase in numbers of unrelated, yet beneficial, microbial species within the rhizosphere and, concomitantly, cause significant yield increases and/or nitrogen sparing effects.

Id. at 6:9-13. This statement identifies three benefits that certain "probiotic Bacillus bacteria" provide: (1) an increase in the number of unrelated, yet beneficial, microbial species within the rhizosphere; (2) a significant yield increase; and (3) a reduction in the amount of nitrogen. According to the express language in this statement, only "certain" probiotic Bacillus bacteria provide those three specific benefits. Plaintiffs argue that all of these statements are consistent with their broad definition of "probiotic Bacillus bacteria" as meaning "Bacillus bacteria that are capable of benefitting a plant when introduced to the soil close to the plant." Plaintiffs, however, note that none of these statements suggests that all "probiotic Bacillus bacteria" necessarily increase plant yield or reduce nitrogen requirements.

Defendants, on the other hand, argue that, in the context of the patents-in-suit, the construction of "probiotic Bacillus bacteria" must be limited to "Bacillus bacteria that increase yield or reduce nitrogen requirements of agricultural plants." Defendants contend that the patentee limited the scope of "probiotic Bacillus bacteria" when he defined the invention as follows:

> More specifically, the invention concerns compositions comprising at least one species of probiotic Bacillus bacteria that exert a positive effect on the yield of agricultural plants and/or reduce the nitrogen requirements of agricultural plants, and animal manure that has been decontaminated to reduce the concentration of undesirable microorganisms.

'179 Patent at 3:38-41. According to Defendants, by describing his "invention," the inventor unmistakably indicates that his invention includes "probiotic Bacillus bacteria" which demonstrate the properties of "a positive effect on the yield of agricultural plants" and/or a reduction in the "nitrogen requirements of agricultural plants." Furthermore, Defendants note that their expert testified that two of the benefits provided by "probiotic Bacillus bacteria" are an increase in plant yield and a reduction in nitrogen requirements. As such, Defendants argue that

"probiotic Bacillus bacteria" must be construed as including only "Bacillus bacteria that increase yield or reduce nitrogen requirements of agricultural plants."

ii. Analysis

Plaintiffs cite to numerous statements which indicate that there are many types of "probiotic Bacillus bacteria" and that those bacteria provide benefits above and beyond increasing yield and decreasing nitrogen requirements. *See, e.g.*, '179 Patent at 1:52-57; 3:64-66; 6:9-13. Significantly, one of those statements actually identifies *three* benefits that "probiotic Bacillus bacteria" provide – an increase in the number of unrelated, yet beneficial, microbial species within the rhizosphere along with a significant yield increase and a reduction in the amount of nitrogen. *Id.* at 6:9-13. Considering this, the court rejects Defendants' contention that the patentee disavowed "probiotic Bacillus bacteria" that provide benefits other than an increase in yield and/or a reduction in nitrogen requirements. As such, the court construes "probiotic Bacillus bacteria" to mean "Bacillus bacteria that are capable of benefitting a plant when introduced to the soil close to the plant." This construction is consistent with the various uses of the term in the specification and avoids reading preferred embodiments into the claim language.

e. The Yield Terms

i. "Yield" ('224: 12)

Representative Claim Language	Plaintiffs' Proposed Construction	Defendants' Proposed Construction
'224 Patent, Claim 12 A method of increasing the **yield** of a plant while reducing the nitrogen effect, the method comprising the steps of: a) supplying to a rhizosphere of a plant a sufficient amount of a fertilizer composition comprising decontaminated manure and Bacillus spores to increase yield without significantly increasing the nitrogen effect; and b) maintaining contact between the rhizosphere of the plant and the composition for a time sufficient to enhance yield of the plant while reducing nitrogen effect.	No construction is required. In the alternative, the term "yield" means the amount of a plant product.	The amount of food crop harvested.

1. The Parties' Proposed Constructions

Plaintiffs first argue that the term "yield" needs no construction. In the alternative, Plaintiffs contend that their proposed construction – "yield" means "the amount of a plant product" – is consistent with the common, ordinary meaning of the term. Furthermore, Plaintiffs argue that their proposed construction is supported by the specification, which generally refers to maximizing and maintaining "plant yields" or "yield of a plant." *See, e.g.*, '179 Patent at 1:20-22; 1:27; 5:50. The specification also explains that an aspect of the invention relates to a "fertilizer composition for plant production." *Id.* at 3:45-46.

Defendants, on the other hand, argue that the term "yield" refers to the amount of "food crop" only. In support of this argument, Defendants note that all of the examples in the specification refer to food crops, vegetables, rice, and fruit. *See, e.g., id*. at 19:21; 20:49; 23:29; 24:7 24:43. Furthermore, Defendants rely on the testimony of their expert in which he stated that it is generally understood that the term "yield" refers to food crops.

2. Analysis

Defendants fail to cite to any reference in the patents-in-suit which indicate that the patentee disavowed all "yields" other than food crop yields. As Plaintiffs note, the patents generally discuss maximizing and maintaining "plant yields" or "yield of a plant." *See, e.g.*, '179 Patent at 1:20-22; 1:27; 5:50. Furthermore, Table 1 in the specification specifically mentions that the N-P-K variations in "Tobacco," "Turf," and "Ornamentals & Flowers" fall within the scope of the present invention. *Id.* at 8:45-60. Considering this, the court rejects Defendants' argument that the scope of the term "yield" should be limited to only food crop yields. Rather, the court agrees with Plaintiffs and construes the term "yield" to mean "the amount of a plant product." This construction is consistent with the broad manner in which the term is used throughout the specification and does not read any preferred embodiments out of the claims.

ii. "Maintaining Contact Between…"; "Time Sufficient to Enhance Yield of the Plant…"; and "Sufficient Amount of a Fertilizer Composition" ('224: 12)

Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**
'224 Patent, Claim 12 A method of increasing the yield of a plant while reducing the nitrogen effect, the method comprising the steps of: a) supplying to a rhizosphere of a plant a sufficient amount of a fertilizer composition comprising decontaminated manure and Bacillus spores to increase yield without significantly increasing the nitrogen effect; and b) **maintaining contact between the rhizosphere of the plant and the composition for a time sufficient to enhance yield of the plant while reducing nitrogen effect**.	No construction is required. In the alternative, this term means maintaining the fertilizer composition in contact with the rhizosphere of the plant for any amount of time that is enough to increase the "yield" of the plant while reducing its "nitrogen effect" when compared to the "yield" and "nitrogen effect" of a non-fertilizer.	This term means maintaining the fertilizer composition in contact with the rhizosphere of the plant for any amount of time that is enough to increase the "yield" of the plant while reducing its "nitrogen effect."
Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**

'224 Patent, Claim 12 A method of increasing the yield of a plant while reducing the nitrogen effect, the method comprising the steps of: a) supplying to a rhizosphere of a plant a sufficient amount of a fertilizer composition comprising decontaminated manure and Bacillus spores to increase yield without significantly increasing the nitrogen effect; and b) maintaining contact between the rhizosphere of the plant and the composition for a **time sufficient to enhance yield of the plant while reducing nitrogen effect.**	No construction is required. In the alternative, this term means any amount of time that is enough to increase the "yield" of the plant while reducing the "nitrogen effect" of the fertilizer composition when compared to the "yield" and "nitrogen effect" of a non-fertilizer.	This term means any amount of time that is enough to increase the "yield" of the plant while reducing the "nitrogen effect" of the fertilizer composition.
Representative Claim Language	**Plaintiffs' Proposed Construction**	**Defendants' Proposed Construction**
'224 Patent, Claim 12 A method of increasing the yield of a plant while reducing the nitrogen effect, the method comprising the steps of: a) supplying to a rhizosphere of a plant a **sufficient amount of a fertilizer composition** comprising decontaminated manure and Bacillus spores to increase yield without significantly increasing the nitrogen effect; and b) maintaining contact between the rhizosphere of the plant and the composition for a time sufficient to enhance yield of the plant while reducing nitrogen effect**.**	No construction is required. In the alternative, this term means any amount of a fertilizer composition that is enough to increase the "yield" of the plant without significantly increasing the "nitrogen effect" of the fertilizer composition when compared to the yield and nitrogen effect of a non-fertilizer.	This term means any amount of a fertilizer composition that is enough to increase "yield" of the plant without significantly increasing the "nitrogen effect" of the fertilizer composition.

1. The Parties' Proposed Constructions

Plaintiffs contend that the terms "maintaining contact between the rhizosphere of the plant and the composition for a time sufficient to enhance yield of the plant while reducing nitrogen effect" and "sufficient amount of a fertilizer composition" need no construction. In the alternative, Plaintiffs propose that the court construe the terms to mean: (1) "maintaining the fertilizer composition in contact with the rhizosphere of the plant for any amount of time that is enough to increase the 'yield' of the plant while reducing its 'nitrogen effect' when compared to the 'yield' and 'nitrogen effect' of a non-fertilizer;" and (2) "any amount of a fertilizer composition that is enough to increase the 'yield' of the plant without significantly increasing the 'nitrogen effect' of the fertilizer composition when compared to the yield and nitrogen effect of a non-fertilizer." The parties' proposed constructions are essentially identical, except for

Plaintiffs' inclusion of the phrase "when compared to the yield and nitrogen effect of a non-fertilizer." Plaintiffs contend that the language requiring a comparison with non-fertilizer is necessary because Defendants' expert testified that the determination of whether yield is increased and/or nitrogen effect is reduced for a particular fertilizer composition logically involves a comparison with non-fertilizer. Plaintiffs, however, cite to nothing in the specification to support this contention. Defendants, on the other hand, argue that the comparison to non-fertilizer language merely adds complexity to the claims by requiring a comparison with an unknown and undefined quantity.

2. Analysis

Considering that Plaintiffs' proposed "when compared to…non-fertilizer" limitation finds no support in the patents-in-suit, the court rejects that limitation. Furthermore, neither Plaintiffs' nor Defendants' proposed constructions will assist the jury in evaluating the claim language – both constructions merely reorganize the claim language. As such, the court concludes that these terms are to be construed according to their plain and ordinary meaning.

V. TYPOGRAPHICAL ERROR CORRECTIONS

The parties have agreed to correct the following typographical errors:

rhizospherer ('994, Claim 27)	This term means "rhizosphere"
non-*Bacillus*organisms ('224, Claim 14)	This term means "non-bacillus organisms"
non-*Bacillus*beneficial organisms ('224, Claim 14)	This term means "non-bacillus beneficial organisms"
Bacillusspores ('224, Claim 14)	This term means "Bacillus spores," as construed separately

Plaintiffs argue, and Defendants do not dispute, that correction of these terms complies with the Federal Circuit's ruling in *Ultimax Cement Mfg. Corp. v. CTS Cement Mfg. Corp.*, 587 F.3d 1339 (Fed. Cir. 2009). Specifically, Plaintiffs contend that the requested corrections are not subject to reasonable debate to one of ordinary skill in the art, and that the claim language, specification, and prosecution history do not suggest a different interpretation. The court agrees with Plaintiffs and, therefore, adopts the proposed typographical error corrections.

VI. CONCLUSION

The court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit. The parties are ordered that they may not refer, directly or indirectly, to each other's claim construction positions in the presence of the jury. Likewise, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the definitions adopted by the court.

It is so ORDERED.

SIGNED this 12th day of April, 2011.

CHARLES EVERINGHAM IV
UNITED STATES MAGISTRATE JUDGE